

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV. 9-2001)		ATTORNEY'S DOCKET NUMBER 60130-1369
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		
INTERNATIONAL APPLICATION NO. PCT/EP00/09525	INTERNATIONAL FILING DATE September 28, 2000	PRIORITY DATE CLAIMED September 28, 1999
TITLE OF INVENTION Vehicle Door and Assembling Method as Well as Disassembling Method for the Same		
APPLICANT(S) FOR DO/EO/US Rainer Grimm, et al.		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.</p> <p>4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31).</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <ul style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). <p>6. <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).</p> <ul style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <ul style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input checked="" type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. <p>8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p>		
Items 11 to 20 below concern document(s) or information included:		
<p>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A FIRST preliminary amendment.</p> <p>14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>15. <input type="checkbox"/> A substitute specification.</p> <p>16. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.</p> <p>18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4).</p> <p>19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).</p> <p>20. <input checked="" type="checkbox"/> Other items or information: Certificate of Mailing EL 747 232 222 US</p>		

U.S. APPLICATION NO. (If known, see 37 CFR 1.51)
10/089041INTERNATIONAL APPLICATION NO.
PCT/EP00/09525ATTORNEY'S DOCKET NUMBER
60130-136921. The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):**Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. **\$1040.00**International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **\$890.00**International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **\$740.00**International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **\$710.00**International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **\$100.00****ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY****\$ 1040.00**Surcharge of **\$130.00** for furnishing the oath or declaration later than 20 30 months from the earliest claimed priority date (37 CFR 1.492(e)).**\$**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$
Total claims	20	- 20 =	0	x \$18.00
Independent claims	2	- 3 =	0	x \$84.00

MULTIPLE DEPENDENT CLAIM(S) (if applicable)		+	\$280.00	\$
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TOTAL OF ABOVE CALCULATIONS = \$ 1040.00

<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.		+	\$
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SUBTOTAL = \$ 1040.00

Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).		\$
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TOTAL NATIONAL FEE = \$ 1040.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property		+	\$
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TOTAL FEES ENCLOSED = \$ 1040.00

Amount to be refunded:	\$
charged:	\$ 1040.00

- A check in the amount of **\$ 1040.00** to cover the above fees is enclosed.
- Please charge my Deposit Account No. **50-1482** in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **50-1482**. A duplicate copy of this sheet is enclosed.
- Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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 SIGNATURE

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REGISTRATION NUMBER _____

Dated: March 26, 2002

10/089041

JC10 Rec'd PCT/PTO 26 MAR 2002

60130-1369
00MRA0028

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Rainer Grimm, et al.
Serial No.: Unknown
Filed: Herewith
Priority: PCT/EP00/09525 Filed: September 28, 2000
DE 199 46 307.7 Filed: September 28, 1999
Group Art Unit: Unknown
Examiner: Unknown
Title: VEHICLE DOOR AND ASSEMBLING METHOD AS WELL
AS DISASSEMBLING METHOD FOR THE SAME

PRELIMINARY AMENDMENT

Box PCT
Assistant Commissioner of Patents
Washington, D.C. 20231

Dear Sir:

Please amend the application in the following particulars prior to Examination.

IN THE SPECIFICATION:

Page 1, after the title and above line 1, please insert the following section heading:

BACKGROUND OF THE INVENTION

Page 2, line 15, please insert the following section heading:

SUMMARY OF THE INVENTION

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00MRA0028

Page 5, line 17, please insert the following section heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Page 6, line 14, please insert the following section heading:

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Please insert the following paragraph at the end of page 8:

The foregoing description is only exemplary of the principles of the invention. Many modifications and variations of the present invention are possible in light of the above teachings. The preferred embodiments of this invention have been disclosed, however, so that one of ordinary skill in the art would recognize that certain modifications would come within the scope of this invention. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specially described. For that reason the following claims should be studied to determine the true scope and content of this invention.

Please delete the text on page 9.

IN THE CLAIMS:

Page 10, before the first claim, please insert the section heading:

--What is claimed is:--

Please delete claims 1-11.

Please add claims 12-31:

12. (NEW) A vehicle door comprising:

at least one support element and at least one outer panel element, said support element having a service opening on an outer side which is closed off by said outer panel element, wherein at least part of an edge zone of the outer panel element is provided with a spacing element of adjustable dimension for fastening of said outer panel element to said support element.

13. (NEW) The vehicle door according to claim 12, wherein said spacing element is made of a settable plastic.

14. (NEW) The vehicle door according to claim 13, wherein said settable plastic is a heat-sensitive adhesive.

15. (NEW) The vehicle door according to claim 14, wherein said heat sensitive adhesive is reversibly heat-sensitive.

16. (NEW) The vehicle door according to claim 12, wherein said spacer element connects to said outer panel element with said support element.

17. (NEW) The vehicle door according to claim 12, wherein said spacer element is movable in at least two directions.

18. (NEW) The vehicle door according to claim 12, wherein at least one elongated stiffening element is provided in said edge zone of said outer panel element.

19. (NEW) The vehicle door according to claim 18, wherein said stiffening element is detachably joined to said support element.

20. (NEW) The vehicle door according to claim 19, wherein said stiffening element is continuously sealed along said support element.

21. (NEW) The vehicle door according to claim 12, wherein said support element and said outer panel element form a hollow chamber.

22. (NEW) The vehicle door according to claim 15, wherein said heat sensitive adhesive is heated to allow removal of said outer panel element from said support element.

23. (NEW) The vehicle door according to claim 12, further including an interior panel element.

24. (NEW) The vehicle door according to claim 12, wherein said support element contains at least one of a hinge and a closure element.

25. (NEW) The vehicle door according to claim 12, wherein said support element is connected to at least one of a hinge and a closure element.

26. (NEW) The vehicle door according to claim 12, further including a stiffening element secured to a said outer panel element.

27. (NEW) The vehicle door according to claim 26, wherein said spacer element connects said outer panel element with said stiffening element.

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28. (NEW) The vehicle door according to claim 12, wherein said outer panel element is detachably joined to said support element.

29. (NEW) The vehicle door according to claim 19, wherein said stiffening element is detachably joined to said support element by at least one bolt.

30. (NEW) A method of assembling a vehicle door comprising the steps of:
providing a heat sensitive spacing element of adjustable dimension for fastening of an outer panel element to a support element; and
heating said spacing element to secure said outer panel to said spacing element and said spacing element to said support element.

31. (NEW) The method as recited in claim 31, further including the step of re-heating said spacing element to remove said outer panel from said spacing element.

60130-1369
00MRA0028**IN THE ABSTRACT:**

Please replace the abstract as follows:

A vehicle door consisting of at least one support element, at least one outer panel element and optionally an interior panel element, in which the support element contains at least one hinge, hinge plate or similar moving element and/or a closure element or the support element is or can be connected to the latter, wherein the support element has a service opening on its outer side and the service opening can be closed off by means of the outer panel element, in particular, with the support element already installed in the vehicle. In order to achieve an easing of the perfectly fitted assembling for vehicle doors, it is proposed that the outer panel element is or can be provided in at least part of its edge zones with an adjustable spacing element for precisely positioned fastening of the outer panel element to the support element and/or the stiffening element.

REMARKS

Applicant respectfully requests examination of this application.

Respectfully submitted,

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Dated: March 26, 2002

60130-1369
00MRA0028

VERSION WITH MARKINGS TO SHOW CHANGES MADE
SPECIFICATION

Page 1, after the title and above line 1, please insert the following section heading:

BACKGROUND OF THE INVENTION

Page 2, line 15, please insert the following section heading:

SUMMARY OF THE INVENTION

Page 5, line 17, please insert the following section heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Page 6, line 14, please insert the following section heading:

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

60130-1369
00MRA0028

VERSION WITH MARKINGS TO SHOW CHANGES MADE

CLAIMS

Page 10, before the first claim, please insert the section heading:

--What is claimed is:--

VERSION WITH MARKINGS TO SHOW CHANGES MADE

ABSTRACT

Please replace the abstract as follows:

A [Vehicle] vehicle door consisting of at least one support element [(12)], at least one outer panel element [(14)] and optionally an interior panel element [(16)], in which the support element [(12)] contains at least one hinge, hinge plate or similar moving element [(18)] and/or a closure element [(20)] or the support element [(12)] is or can be connected to the latter, wherein the support element [(12)] has a service opening [(22)] on its outer side [(12A)] and the service opening [(22)] can be closed off by means of the outer panel element [(14)], in particular, with the support element [(12)] already installed in the vehicle. In order to achieve an easing of the perfectly fitted assembling for vehicle doors, it is proposed that the outer panel element [(14)] is or can be provided in at least part of its edge zones [(14A)] with an adjustable spacing element [(26)] for precisely positioned fastening of the outer panel element [(14)] to the support element [(12)] and/or the stiffening element [(24)].

**Vehicle door and assembling method as well as disassembling method
for the same**

The invention refers to a vehicle door with the characteristics of the preamble of Claim 1 as well as an assembling method for the same according to Claim 11 and a disassembling method for the same according to Claim 12. This may involve driver, passenger, rear side or rear doors as well as both pivoting and 5 sliding doors, in which, therefore, pivoting or sliding hinges are used for opening, for example.

In conventional vehicle doors it is common to join a support element constituting the supporting structure to the outer panel by peripheral welding, 10 flanging or glueing, and to install the vehicle door in this state, with or without functional parts, such as lock, hinges, window lifter and the like, already installed to the support element, to the door opening of the vehicle which is to be closed off. The connection takes place in the hinge area. The so-called setting of the door is an assembly process requiring considerable experience, 15 since the door must sit precisely positioned in all three spatial coordinates. For instance, vehicle doors are supposed to have a uniform gap with respect to the chassis in the X and Z directions (longitudinal and vertical directions of the vehicle). In the Y direction (transverse direction of the vehicle), the outer

surface of the door should be as flush as possible with the rest of the car body. Therefore, the positioning accuracy must be visually checked after a preliminary installation of the vehicle door in the body and the door must be realigned in the body if necessary. In case the equipping of the door with functional parts such as window lifters and the like takes place only after the setting of the door in the body is finished, the subsequent weight increase of the door and thus a possibly changing position of the door with respect to the body must be taken into account during the initial setting of the door. Installation work in case of repairs to the vehicle door is equally difficult.

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A corresponding vehicle of this class is already known from DE-A1-30 04 897 showing an outer panel element rigidly screwed together with a support element. Therefore, the entire adjusting work is to be made with the support element.

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Proceeding from this, the invention is based on the object of achieving an easing of the perfectly fitted assembling for vehicle doors of this class.

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This problem is solved by a vehicle door with the characteristics of Claim 1 as well as the corresponding assembling method according to Claim 11 and the disassembling method according to Claim 12.

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By employing at least one adjustable spacer element that takes effect between the outer panel element and the support element, final manufacturing tolerances or a possibly not 100% aligned installation of the support element is compensated. Preferably, a settable plastic that is applied in the not-yet set state to the support element, the outer panel element or a possible stiffening element of sufficient material strength is used as the spacer element. If the outer panel element is now moved towards the support element with the support element already installed in the chassis then, shortly before it reaches the desired installation position, the settable plastic comes into contact with the

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respective opposite component. The outer panel element is then moved into its desired final position, in which the peripheral gaps and the flushness exhibit the desired values. Since the outer panel element, preferably already surface-treated in this state, can be extraordinarily light, simple, in particular, 5 automatable, handling devices for moving, holding and adjusting the outer panel element can be used. After reaching the desired final position, the outer panel element is held in this position long enough for the plastic to set sufficiently and thus the desired final dimension is in a sense "frozen in." Any tolerances between outer panel and support element are thus compensated for 10 by the resulting final dimension of the spacer element, in particular, the settable plastic.

However, pure mechanical means as telescopic means like spacer bushes, for instance, can be considered as spacer elements. These mechanical means 15 include fastening means such as screws or the like, in order to fix the outer panel in the assembled state. Specifically, spacer elements being effective in two, preferably in three, directions of space are preferred. This can be easily achieved by spacer elements made from settable plastic.

20 It is particularly preferable for the spacer element to also take on a fastening function. With settable plastic as a spacer element, therefore, an adhesion can also be brought about, if desired.

25 Heat-sensitive spacer elements as thermoplasts or hot-melt-type adhesive allow a readjusting and/or disengageable connection of the outer panel with the support element or the stiffening element. Heating means for readjusting the heat-sensitive spacer elements or disengaging the outer panel can be placed nearby the heat-sensitive spacer elements as well as can be integrated into the vehicle door.

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The outer panel element can be kept very thin-walled, so that it is very flexible

in the initial assembly. Likewise, the support element as such can be designed with respect to its stiffness such that this stiffness does not suffice by itself for the finished vehicle door. In the first case as well as in the second case, and also if both cases apply, the ultimately desired stiffness can be achieved by at least one, and preferably several, elongated stiffening elements, preferably linked together in the form of a frame, for the outer panel element and/or the support element. To this end, the stiffening element is preferably provided in the peripheral area of the service opening.

10 If such a stiffening element can be detachably joined to the support element, this has the effect, first of all, that the stiffening element can already be joined to the support element while setting the support element in the chassis, that is to say, its weight is taken into account during alignment and its stiffening effect is exerted on the support element. If in this case the outer panel element is joined to the stiffening element during the later closing of the service opening essentially to maintain a spacing, then the contact surface between stiffening element and support element serves as a later separation plane in case of maintenance work or the like on the functional parts of the door that may be necessary. Since the stiffening element is joined to the outer panel element in this case in a manner that fits - the specific door opening - perfectly, the stiffening element constitutes a structural unit with the outer panel element after initial assembly. Due to the detachability of the stiffening element from the support element, then, this component can later be removed as a complete assembly, with the stiffening element providing the relatively thin-walled outer panel element with sufficient stiffness that, even under shop conditions, an exposure of the service opening and subsequent reclosure is possible without problems.

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30 The support element equipped with all functional parts can be inserted into the chassis and connected to it before the outer panel is applied. The equipping of the support element with functional parts can also take place before and/or

after fastening the support element to the chassis and an alignment of the support element with respect to the chassis can be carried out in a single work sequence without opening and again closing the support element. The adjustment of the support element can be accomplished with the aid of assembly blocks known from other fields, which indicate the final dimensions reached after the later placement of the outer panel element. The connecting of the support element with the outer panel element can take place in various ways, for instance, by blind bolting (bolting from the inside) and/or by glueing together.

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The aforementioned components to be used according to the invention, as well as those claimed and described in the embodiments, are not subject to any special requirements regarding their size, shaping, material selection or technical conception, so that the selection criteria familiar in the respective field of application can be applied without restriction within the scope of the claims.

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Additional details, characteristics and advantages of the object of the invention result from the subordinate claims as well as the description below of the associated drawing in which, for the sake of example, preferred embodiments of the vehicle door are presented. Shown in the drawing are:

Figure 1 a vehicle with the driver-side door, partially in an exploded view;

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Figure 2 a passenger-side door for the same vehicle, partially in an exploded view;

Figure 3A the vehicle door of Figure 1 in a horizontal sectional representation (in part) - section along the line IIIA-III A according to Figure 1;

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Figure 3B an additional horizontal section (in part) of the same vehicle door-section along line IIIB-IIIB according to Figure 1;

5 Figure 4 a vertical sectional view of the door of Figure 1 or Figure 2 in the sill area with a raised window pane;

Figure 5 an alternative embodiment of a vehicle door in vertical section through the lower area (rocker panel area);

10 Figure 6 a vehicle door with mechanical spacer elements being effective in three dimensions of space;

Figure 7 a vehicle door with a integrated disassembling device.

15 As is best seen from Figure 2, a vehicle door, here a passenger door, has a support element 12 of sheet metal, which is designed as a deep-drawn part and is essentially free of openings, or in which any openings can be tightly covered, in order to obtain a dry space for electrical components on the vehicle interior side of support element 12. This inner side is covered by a conventional interior panel element 16, made of plastic, for instance. As is further evident from Figures 1 and 2, the outer panel element 14 represents an independent component, which is put in place on the support element from the outside only after the installation of the preferably already completely equipped support element 12 in the vehicle chassis and after alignment has been performed. As is additionally visible from Figure 1, various functional parts such as hinges 18, a closure element 20, a side-impact beam 30 and stiffening elements 24 are accessible on the outside 12A of the support element 12.

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30 In order that the vehicle door can be initially installed in the vehicle chassis without an outer panel element 14 and aligned there, the support element 12 has a large service opening 22, which is surrounded by a frame-shaped

stiffening element 24, on its outer side 12A.

As is evident from Figures 3A-5 in detail, the stiffening element 24 consists of an essentially frame-shaped structure whose spanned area corresponds roughly to the opaque part of the door, that is, the part not having a window pane. In the area of the A-pillar, the B-pillar and for the C-pillar of the vehicle, as well as in the rocker panel area (Figure 5), the stiffening element 24 consists of a tube of roughly trapezoidal cross section. The sill area (Figure 4) consists of a so-called shaft reinforcement 24'. In the corner areas, the four stiffening elements 24, 24' are rigidly connected, not shown in further detail.

According to Figure 3A and Figure 3B the stiffening element 24 has a continuous sealing surface 24A, with which it can be joined to the outer panel element 14 in the edge area 14A. An adjustable-thickness spacer element 26 of hardenable plastic, in particular of a heat-sensitive plastic, reversible as a hot-melt-type adhesive, is used for this joint. The stiffening element 24, moreover, can be detachably bolted to the support element 12 from the inside with bolts 32. During the setting and alignment of the support element in the vehicle chassis, the stiffening element 24 is already firmly bolted to the support element 12, while the outer panel element 14 is still absent. Conventional alignment screws for the door are accessible from the outside through the service opening 22. After the end of this alignment process, the outer panel element 14, which is an already finish-painted deep-drawn piece of, for instance, sheet metal, provided with angled flanges 14B, is moved up to the stiffening element 14 with conventionally known handling equipment. Previously, the outside of the stiffening element 24 or the inside of the outer panel element 14 in the area of the edges is continuously coated, at least in the area of A-, B- and/or C-pillars and the rocker panel with overdimension, with not-yet reacted and sufficiently thixotropic adhesive with filling and sealing characteristics. After the outer panel element 14 has been brought into its final position shown in Figure 3A, it is held there for sufficient time for the plastic

that constitutes the spacing element 26 to adequately harden. Thus, the vehicle door 10 is closed off water-tight against the outside. In case of repairs, the bolts 32 must be loosened from the inside and the spacing element 26 cut free at its narrow contact face with the support element 12 in order to be able 5 to remove the outer panel element 14 together with the stiffening elements 24.

A side-impact beam 30, as shown in Figure 3B, can be fastened to the support element 12 by means of angle brackets 30A without any resulting physical contact with the outer panel element 14. The side-impact beam 30, however, 10 can equally well be joined in a precisely fitted manner to the outer panel element 14 by additional spacing elements 26, in the same manner as the stiffening element 24. In the rocker panel area, inclined run-off surfaces 26A of the spacing element 26 ensure that any condensate or penetrating water can run off via known drainage holes 34.

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Fig. 6 shows the embodiment of Fig. 3A - with exception of the spacing element, which exists of two or three mechanical spacer means 26D in Fig. 6, being of adjustable and fixable length.

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Fig. 7 shows the embodiment of Fig. 3B - with exception of the spacing element, which exists of a heat-sensitive spacer element 26B in Fig. 7, being made of a heat-sensitive plastic material like a hot-melt or thermoplastic resin. An, e.g. electrically operated, heating means 26D being closely positioned with 25 respect to the heat-sensitive spacer element 26B, allows to detach the outer panel element 14 upon heating action by heating means 26D. - This device and method for disassembling structural or functional parts may be advantageously by used in various other applications, particularly in the field of vehicle building and is - insofar - of own valuable technical meaning - even independently from the invention claimed in Claim 1.

List of reference numerals

- 10 Vehicle door
- 12 Support element
- 5 12A Outside
- 14 Outer panel element
- 14A Edge zone
- 14B Flanges
- 16 Interior panel element
- 10 18 Hinge
- 20 Closure element
- 22 Service opening
- 24 Stiffening element
- 24' Shaft reinforcement
- 15 24A Sealing surface
- 26B Heat-sensitive spacer elements
- 26C Heating means
- 26D Mechanical spacer means
- 26 Spacing element
- 20 26A Run-off surfaces
- 28 Hollow chamber
- 30 Side-impact beam
- 30A Angle brackets
- 32 Bolts
- 25 34 Drainage holes
- 36 Window pane

Claims

1. Vehicle door consisting of at least one support element (12), at least one outer panel element (14) and optionally an interior panel element (16), in which the support element (12) contains at least one hinge, hinge plate or similar moving element (18) and/or a closure element (20) or the support element (12) is or can be connected to the latter, wherein the support element (12) has a service opening (22) on its outer side (12A) and the service opening (22) can be closed off by means of the outer panel element (14), in particular, with the support element (12) already installed in the vehicle,
5 characterized in that the outer panel element (14) is or can be provided in at least part of its edge zones (14A) with an adjustable spacing element (26) for precisely positioned fastening of the outer panel element (14) to the support element (12) and/or the stiffening element (24).
- 10
15 2. Vehicle door according to Claim 1, characterized in that the spacing element (26) is a settable plastic.
- 20 3. Vehicle door according to Claim 2, characterized in that the settable plastic is a heat-sensitive adhesive.
- 25 4. Vehicle door according to Claim 3, characterized in that the heat-sensitive adhesive is reversibly heat-sensitive.
5. Vehicle door according to any of the Claims 1 to 4, characterized in that the spacer element (26) also serves as connecting element of the outer panel element (14) with the support element (12) or with the stiffening element (24).

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6. Vehicle door according to any of the Claims 1 to 5 characterized in that the spacer elements are movable and adjustable in at least two directions of space.
- 5 7. Vehicle door according to any of the Claims 1 to 6, characterized by at least one elongated, in particular, frame-shaped stiffening element (24) for the outer panel element (14) and/or the support element (12), preferably provided in the edge areas of the service opening.
- 10 8. Vehicle door according to any of the Claims 1 to 7, characterized in that the stiffening element (24) or the outer panel element can be detachably joined to the support element (12).
9. 15 Vehicle door according to Claim 8, characterized in that the stiffening element (24) has a continuous sealing surface (24A) with respect to the support element (12).
10. 20 Vehicle door according to any of Claims 1 to 9, characterized in that the support element (12) and the outer panel element (14) form, in particular, a completely enclosed hollow chamber (28).
11. 25 Method of assembling a vehicle door according to any of Claims 1 to 10, characterized in that the preassembled vehicle door is firstly mounted and adjusted to the vehicle body and thereafter the outer panel element (14) of the door is brought into contact with an adjustable spacing element (26) being intermediate to the mounted door, and thereafter bringing the outer panel element (14) into its final position under adjustment action of the adjustable spacing element (26), and then fixing the adjustable spacing element (26) in its final position or configuration.

12. Method for disassembling the outer panel element (14) of a vehicle door (10) according to any of the Claims 1 to 10, characterized by heating a heat-sensitive spacer element 26B being used as said adjustable spacing element (26) with heating means (26C) being mounted to the vehicle door (10) and removing the outer panel element (14) afterwards.

12 INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 April 2001 (05.04.2001)

PCT

(10) International Publication Number
WO 01/23200 A1

(51) International Patent Classification⁷: B60J 5/04, B62D 65/00

(21) International Application Number: PCT/EP00/09525

(22) International Filing Date: 28 September 2000 (28.09.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 199 46 307.7 28 September 1999 (28.09.1999) DE

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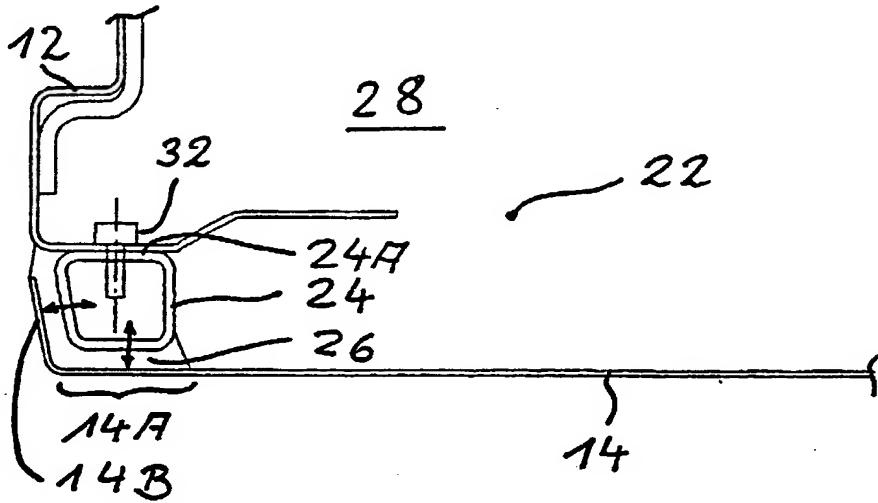
(74) Agent: KÖNIG PALGEN SCHUMACHER KLUIN; Frühlingstrasse 43A, 45133 Essen (DE).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

[Continued on next page]

(54) Title: VEHICLE DOOR AND ASSEMBLING METHOD AS WELL AS DISASSEMBLING METHOD FOR THE SAME



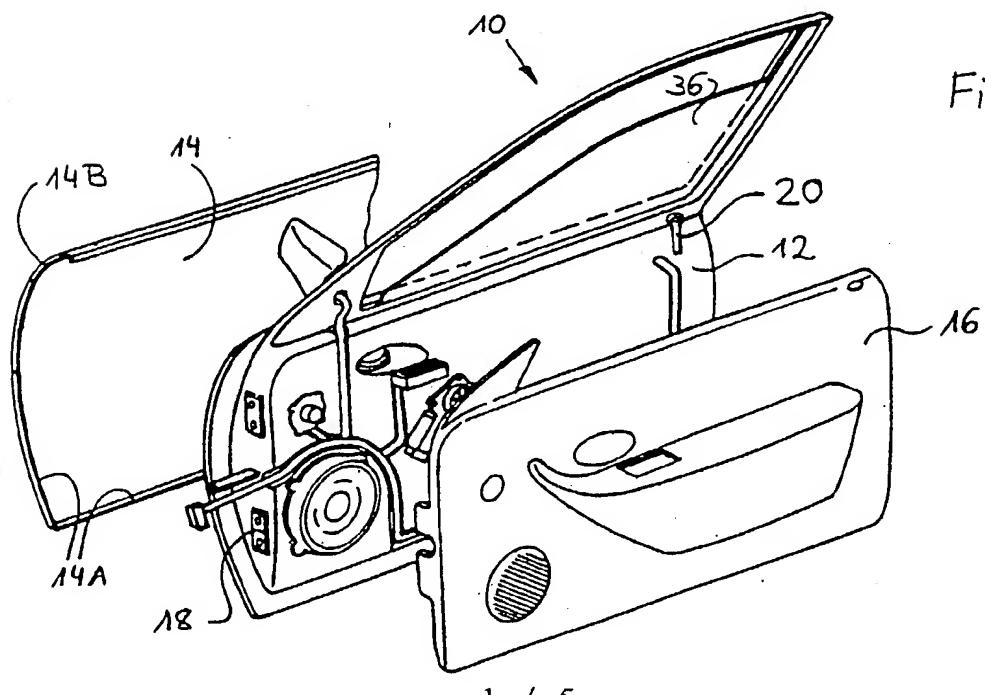
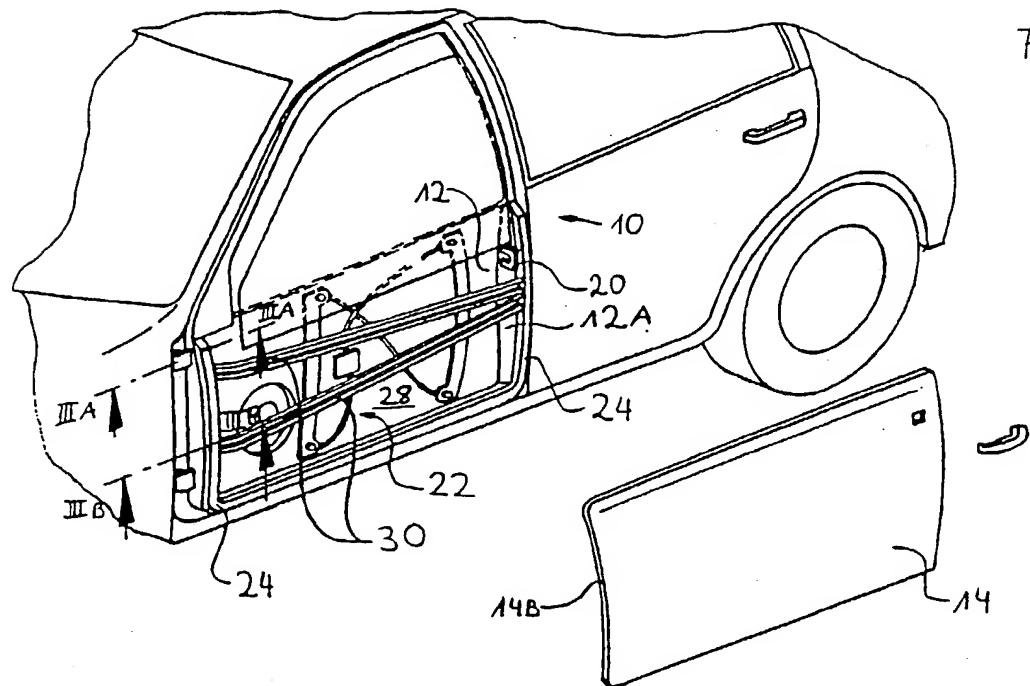
WO 01/23200 A1

(57) Abstract: Vehicle door consisting of at least one support element (12), at least one outer panel element (14) and optionally an interior panel element (16), in which the support element (12) contains at least one hinge, hinge plate or similar moving element (18) and/or a closure element (20) or the support element (12) is or can be connected to the latter, wherein the support element (12) has a service opening (22) on its outer side (12A) and the service opening (22) can be closed off by means of the outer panel element (14), in particular, with the support element (12) already installed in the vehicle. In order to achieve an easing of the perfectly fitted assembling for vehicle doors, it is proposed that the outer panel element (14) is or can be provided in at least part of its edge zones (14A) with an adjustable spacing element (26) for precisely positioned fastening of the outer panel element (14) to the support element (12) and/or the stiffening element (24).

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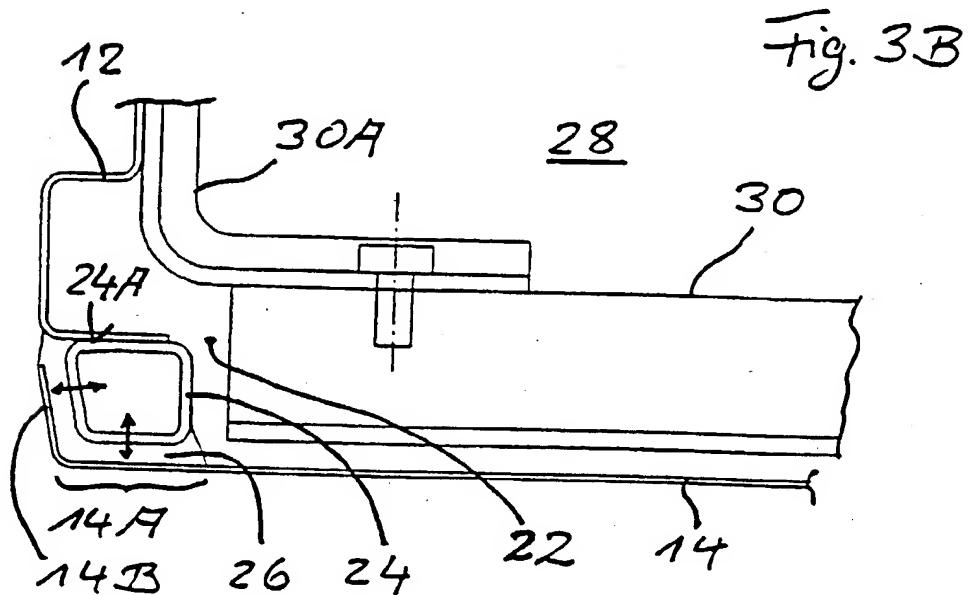
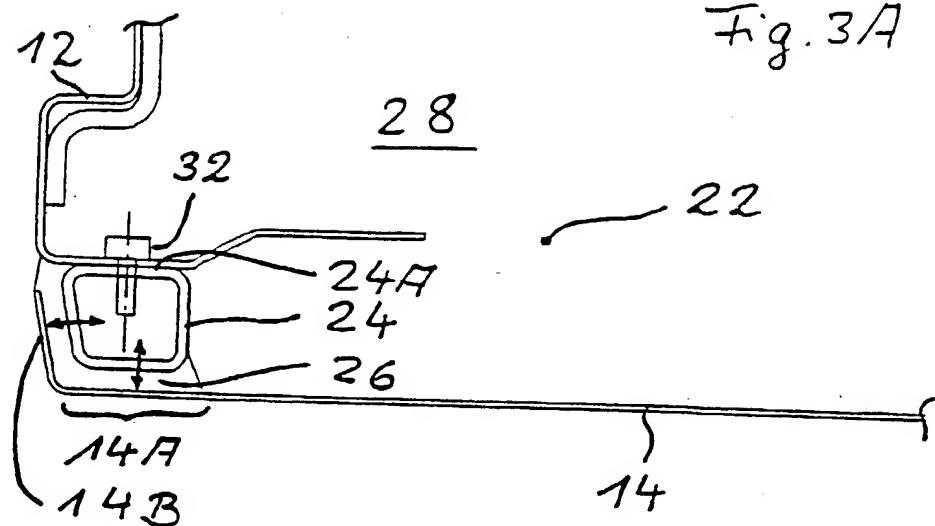
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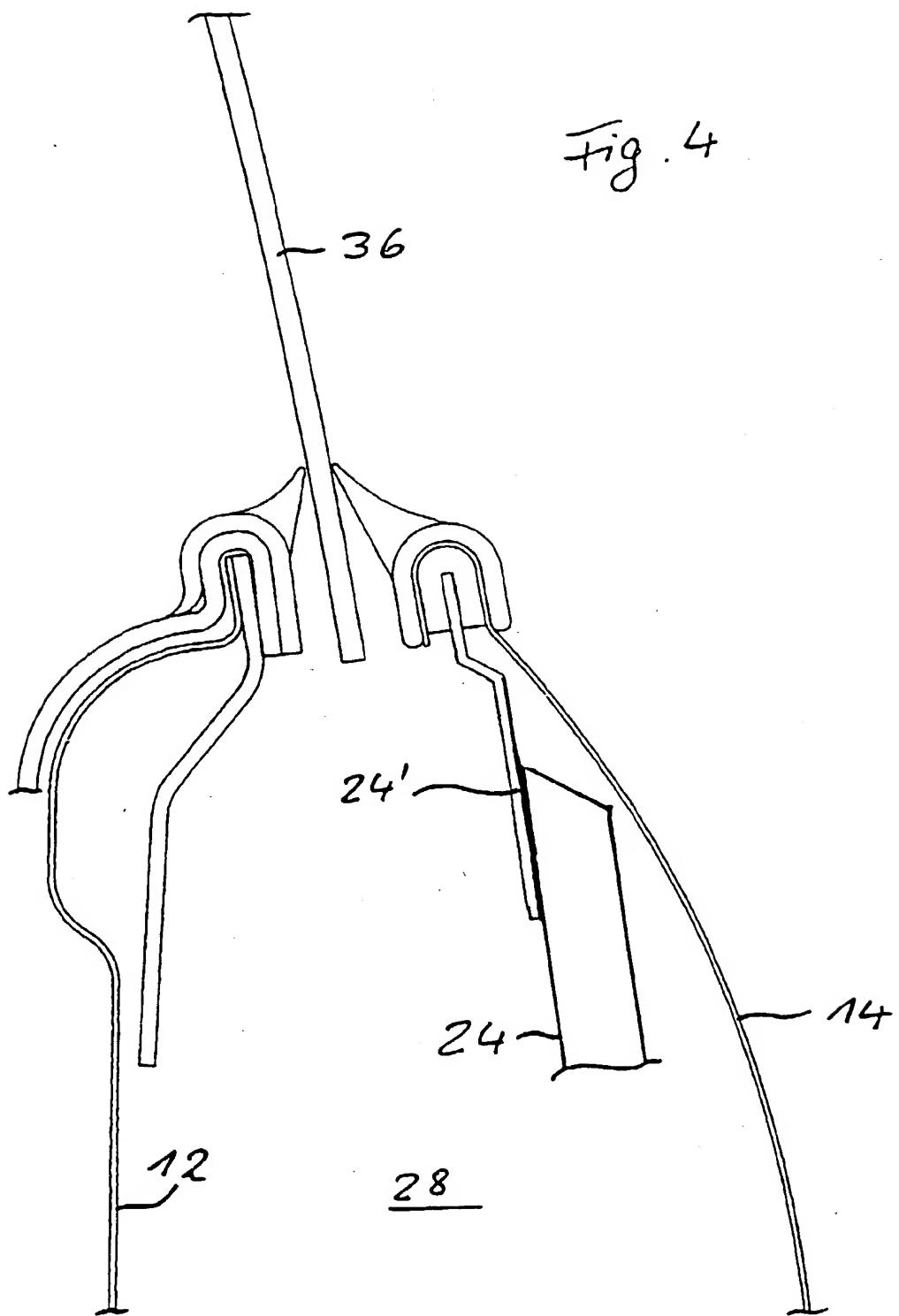
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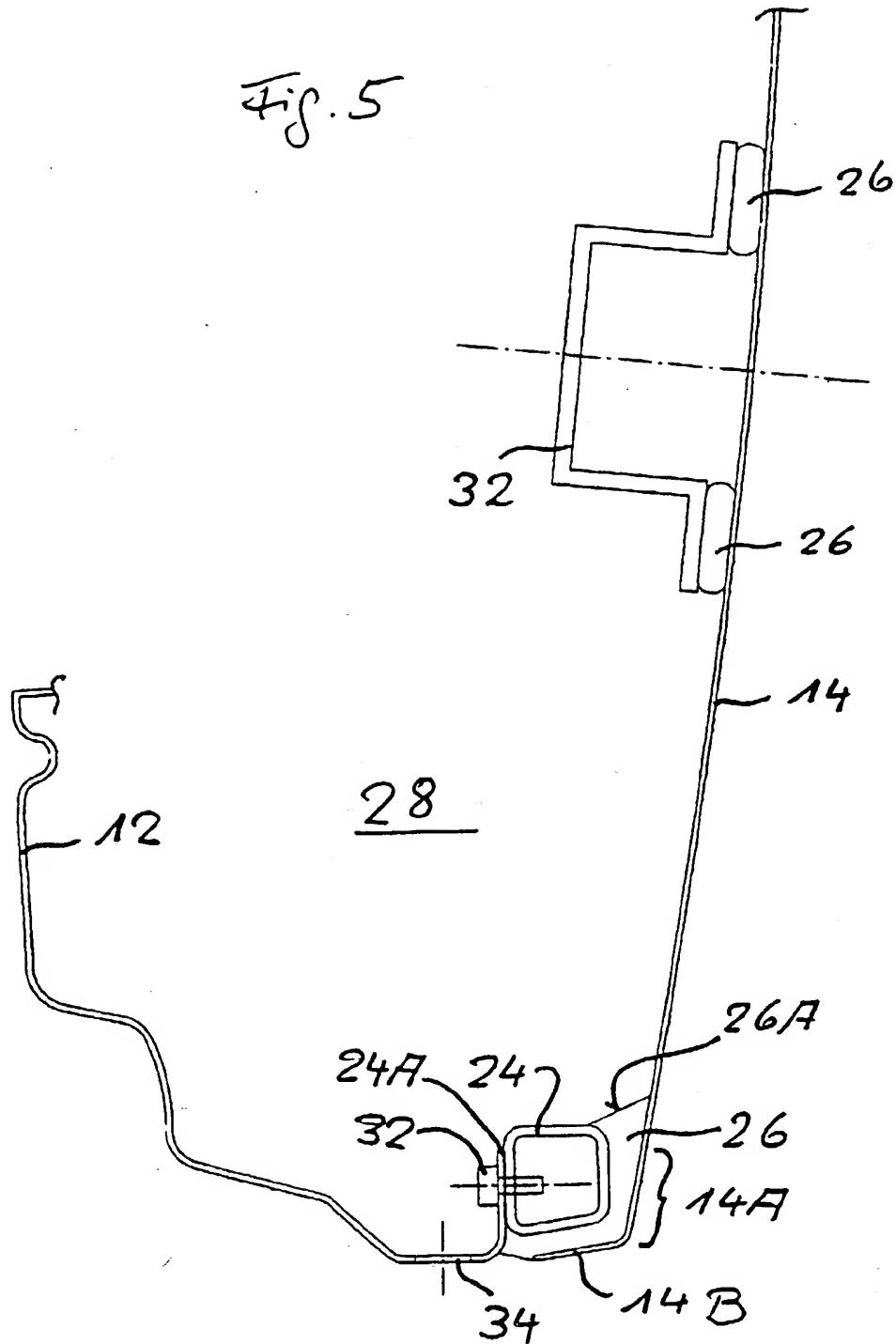


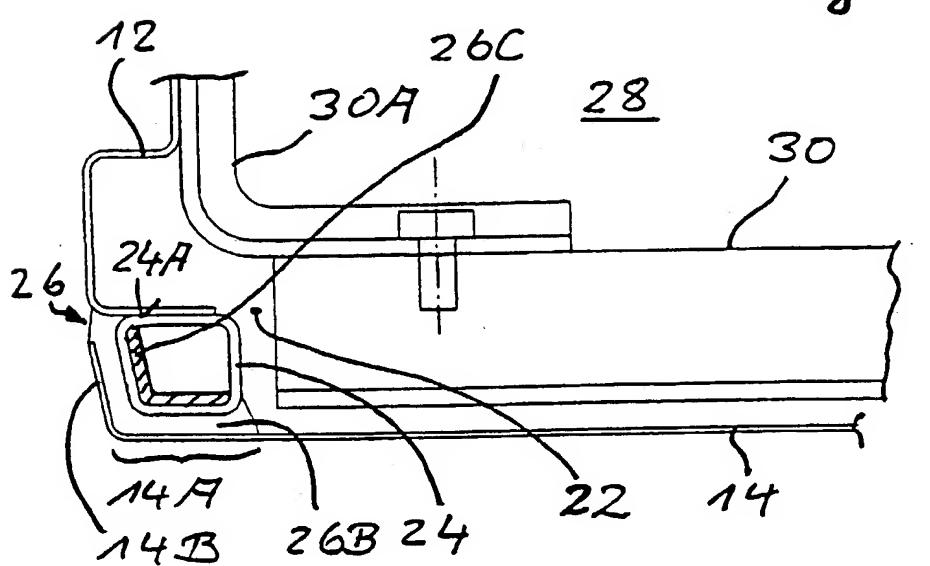
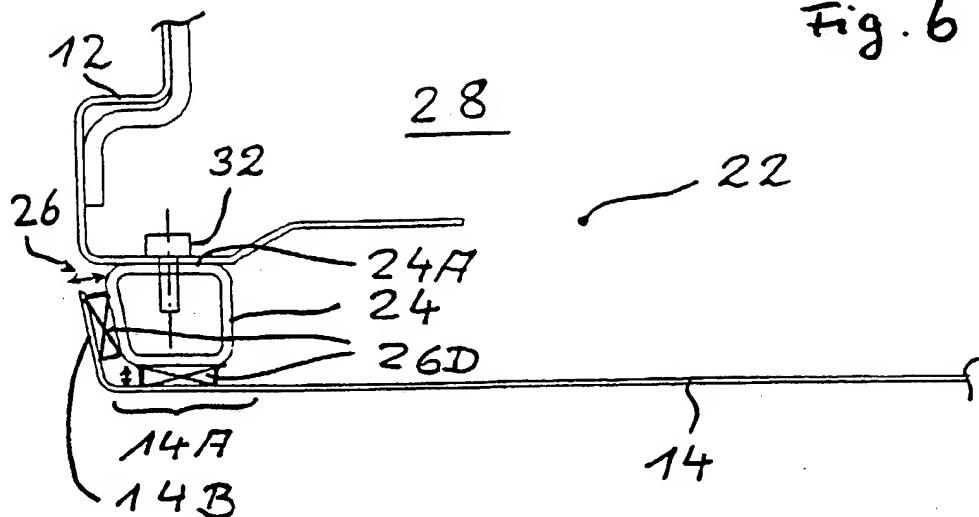
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Fig. 5





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**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

Declaration Submitted with Initial Filing OR Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	60130-1369
First Named Inventor	Rainer Grimm
COMPLETE IF KNOWN	
Application Number	10 / 089 041
Filing Date	March 26, 2002
Group Art Unit	Unknown
Examiner Name	Unknown

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**VEHICLE DOOR AND ASSEMBLING METHOD AS WELL AS DISASSEMBLING METHOD FOR
THE SAME**

(Title of the Invention)

the specification of which

is attached hereto

OR

was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

(if applicable).

Application Number and was amended on (MM/DD/YYYY)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
PCT/EP00/09525 DE 199 46 307.7	Europe Germany	09/28/2000 09/28/1999	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

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Fax (248) 988-8363

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR : A petition has been filed for this unsigned inventor

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Inventor's Signature 



Date 07/08/02

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DECLARATION — Utility or Design Patent ApplicationDirect all correspondence to: Customer Number or Bar Code Label **026096** OR Correspondence address belowName Karin H. ButchkoAddress 400 W. Maple RoadAddress Suite 350City BirminghamState MichiganZIP 48009Country United StatesTelephone (248) 988-8360Fax (248) 988-8363

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR : A petition has been filed for this unsigned inventorGiven Name Rainer
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M. Lee Murrah	<u>27,460</u>		
Theodore W. Olds	<u>33,080</u>		
John E. Carlson	<u>37,794</u>		
David J. Gaskey	<u>37,139</u>		
Kerrie A. Laba	<u>42,777</u>		
William S. Gottschalk	<u>44,130</u>		
David L. Wiss	<u>46,350</u>		
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ADDITIONAL INVENTOR(S) Supplemental Sheet Page 1 of 3

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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Mailing Address			
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Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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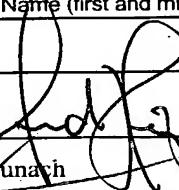
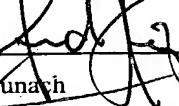
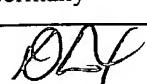
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Page 2 of 3

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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Mailing Address			
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Page 2 of 3

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Arnd G.		Herwig	
Inventor's Signature		Date	
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Mailing Address			
Mailing Address			
City		State	ZIP
Baunach			D-96148
Country		Germany	
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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Patrick		Hof	
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Country		Germany	
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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Inventor's Signature		Date	
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Folkestone		Kent	CT20 3TA
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DECLARATION**ADDITIONAL INVENTOR(S)
Supplemental Sheet**Page 2 of 3

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Arnd G.		Herwig	
Inventor's Signature		Date	
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Mailing Address		Citizenship	
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City	Baunach	State	ZIP D-96148 Country Germany
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Patrick		Hof	
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Residence: City	Marburg	State	Country Germany
Mailing Address		Citizenship	
Eichgarten 14			
Mailing Address			
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Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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City	Folkestone	State Kent	ZIP CT20 3TA Country Great Britain

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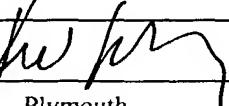
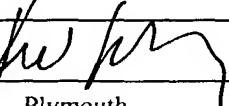
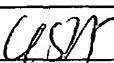
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DECLARATION**ADDITIONAL INVENTOR(S)**
Supplemental Sheet
Page 3 of 3

Name of Additional Joint Inventor, if any:		<input checked="" type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
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Inventor's Signature		Date	
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Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Kenneth W. 		Schang	
Inventor's Signature 		Date <u>July 17, 2002</u>	
Residence: City Plymouth		State MI	Country USA
Mailing Address		Citizenship USA	
46131 Academy 			
Mailing Address			
City Plymouth		State MI	ZIP 48170 Country USA
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Inventor's Signature		Date	
Residence: City		State	Country
Mailing Address		Citizenship	
Mailing Address			
City		State	ZIP
		Country	

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